L-4

Medicine
Health Physics
Industrial Hygiene
Toxicology
Medical Department/3M

3M Center
St. Paul, Minnesota 55101
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September 10, 1982

3M

Mr. Tom Hall
OSHA, Division of Consumer Affairs
Room N-3635
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

Re: Hazard Communication; Proposed Rule and Public Hearings - 47 FR 54:12092-12124. Post Hearing Submission: OSHA request for additional information:
Operating Standard and four Chemical Safety Information Sheets

Dear Mr. Hall:

3M submits with this letter a representative Operating Standard (manufacturing process standard) for a 3M product along with four Chemical Safety Information Sheets pertinent to the manufacture of this 3M product. This Operating Standard and the Chemical Safety Information Sheets provide examples of operating instructions which contain the necessary precautions in lieu of their being supplied by reaction vessel labeling.

This is one type of safety information we provide our employees in the manufacturing plants. This information is available in the operating area for use by the process engineer and operators to insure safe handling of hazardous materials.

Our testimony on June 24, 1982 (p. 12) included the operating standard as an alternative to labels and placards on reaction vessels.

> "Although container labels and placards are an effective and practical method for hazard communication, they are not appropriate or practical for use on reaction vessels and non-dedicated process equipment because of the numerous variations in mixture components or the rapid chemical changes that may take place. As an alternative, OSHA should consider referencing the operating instructions which consists of a list of the process chemicals and steps followed in product manufacturing or processing. These instructions comprise a system already used by industry generally. Because an employee must become familiar with the operating instructions in order to complete the various steps in the formulation of a chemical substance or mixture, information concerning any hazardous chemicals existing at

any stage of the process may be accordingly identified."

After we presented this testimony, OSHA representative Nancy Wentzler asked us to provide OSHA with an actual operating standard. 3M submits the requested Operating Standard and accompanying Chemical Safety Information Sheets on a non-confidential basis.

Chemical names and precautionary statements are made throughout the Standard. We have deleted internal code numbers which are not pertinet to the issue raised by OSHA. 3M Employees use an unabridged Operating Standard in the workplace.

Thank you for this opportunity to provide additional comment.

Sincerely,

Paul W. Willard

Paul W. Willard, Ph.D
Manager, Product Regulatory
Toxicology Services

PWW:mam

Effective: Dec. 14, 1981

Superseding: BC-31/7630 issued 3/26/81

OPERATING STANDARD

Issued Final 3/11/82

L-4

CODE NO.:

BY-PRODUCT: Filter Drippings

DEPT. BURDEN CENTER: 7630 31

MANUFACTURED FOR:

EQUIPMENT: 2,000 gal. glasslined reactor, 303-A-01
1,000 gal. S.S. feed kettle, 303-A-04
Plate-and-frame filter

CHARGES:

CODE	SAFETY STANDARD	DESCRIPTION	VESSEL TO BE CHARGED	AMT.-LBS.
A.	X	Acetone for cleaning (150 gal.)	303-A-04	1,000
B.	X	Acetone for cleaning (150 gal.)	303-A-04	1,000
C.	-	Alcohol	303-A-01	13,590
D.	X	Epichlorohydrin (5 full drums)	303-A-04	2,650
E.	X	Stannic Chloride Anhydrous	303-A-01	180
F.	X	MIBK	303-A-01	5,400
G.	-	D. I. Water	303-A-01	375
H.	-	Sodium Carbonate	303-A-01	180
I.	-	Filter drippings	303-A-01	All Available
J.	-	Hi-Flo Supercel	- - - -	50
K.	-	City water for cleaning (500 gal.)	303-A-01	4,170

* Check drums of at least 24 hours prior to charging to be sure it is fluid. If melting is required, place in oven at 150°F.

CHARGES: (Cont'd)

CODE	SAFETY STANDARD	DESCRIPTION	VESSEL TO BE CHARGED	AMT.-LBS.
L.	-	City Water (250 gal.)	303-A-04	2,085
M.	X	Acetone for cleaning (150 gal.)	303-A-04	1,000

EXPECTED YIELD: 20,000 pounds

ESTIMATED MACHINE TIME: hours

ESTIMATED LABOR TIME: hours

REASON FOR CHANGE:

1. To omit roping off area since epichlorohydrin air samples show well below minimum exposure.
2. To replace code numbers with code numbers, respectively.
3. To use the plate-and-frame filter since the Sparkler has not been available and lot 501 - 511 experience has been with the plate-and-frame.
4. To correct sodium carbonate charge.
5. To change order of standard to specify taking final samples earlier to prevent samples from being overlooked.
6. To stop recycling filtrate through the transfer line as it plugs easily with this product. Instead initial filtrate will be recycled from drums.
7. To specify triple-rinsing empty epichlorohydrin drums before sending to the reconditioner.
8. To transfer acetone flush to scrap acetone trailer for recycling.
9. To specify increased flow meter setting to correspond with a desired 4-hour addition period for epichlorohydrin feed.
10. To stop using caustic to decontaminate epichlorohydrin feed kettle since caustic/epi polymerization product is detrimental to production.
11. To use hot D. I. Water to premix the sodium carbonate for better solution.
12. To delete ppm tin test (QCM-86-16).

RAW MATERIAL SPECIFICATIONS:

All input material must meet Q.C. specifications and be normal in appearance. Sample any material that appears abnormal for additional release.

ADDITIONAL SAFETY PRECAUTIONS:

- PRODUCT. An MIBK solution. Ground all containers and avoid skin contact when handling. Refer to the safety standard for MIBK before handling.

NOTE: (Epichlorohydrin) is a very hazardous material. In addition to the safety standard, read the special precautions listed below before starting this run. If you have not been trained yet for safe handling of epichlorohydrin, have supervisor conduct training for all who will be handling the material.

A. Check the local exhaust hoses - velocity good - hose long enough - clamp on end - hose in good condition. Exhaust hose must be clamped to any open container of Do not have drums open longer than necessary.

B. Fresh air mask must be worn when charging. Wear the special neoprene-coated suit with boots and gloves when charging epichlorohydrin. Each person in the charging area must wear the protective gear. The Epi suits are stock items as follow: small - 800048, medium - 800049, large - 80050, x-large - 800051. After use, the suits should be placed in a polybag and tagged "Caution - Epichlorohydrin - Incinerate". Label with and lot number. Sign with the date and initials, then send the bag to the north scrap dock to be picked up for incineration.

C. Any spill must be cleaned up immediately. Use Zorbal and dispose of in a polybag with bag tie and place in a "soap box". Tag material as "Zorball with Epichlorohydrin from , lot_____" and "Incinerate". Initial and date the tag, then send material to north scrap dock to be picked up for incineration.

ADDITIONAL SAFETY PRECAUTIONS:

D. Have a pail of soapy water in the area when charging to kettle. Wash gloves and tools which come into contact with epichlorohydrin to avoid secondary contamination.

E. Immediately after using a dip pipe and hose to vacuum in the epichlorohydrin, rinse thoroughly with city water. The dip pipe should be left in the last empty drum and rinsed with plenty of water directly into the drum before removing.

OPERATING PROCEDURES

Pre-run Preparation:

1. Check to be certain that the transfer line from the bottom of 303-A-04 to the top of 303-A-01 is clean. The line should be stainless and should include a rotameter with needle valve. (Use a Brooks No. 8 with tube 8M-25-5 and float no. 8-RV-8 which should already be installed). A nitrogen line should also be connected to the bottom of 303-A-04.

2. Inspect 303-A-04 and 303-A-01 to be sure each is clean and dry. Follow the cleaning instructions below. Have supervisor approve system before charging.

   a. Clean and dry all hoses and dip pipes that will be used.

   b. If necessary remove all solids present in 303-A-04 or 303-A-01. Contact supervisor for instructions for entering and removing solids from 303-A-01. Both kettles must be clean and dry.

   c. Inert 303-A-04 and flush with Charge A (acetone). Bubble nitrogen through the bottom valve to agitate for approx. 5 minutes. Pressure

OPERATING PROCEDURE: (Cont'd)

the contents of 303-A-04 through the bottom of the feed kettle up through the transfer line into inerted 303-A-01. Check the transfer line and rotameter for leaks and repair any found. Boil the acetone in 303-A-01 for 1 hour with 45 rpm agitation. (Acetone boils at approx. 134°F.) Reflux (total reflux) through overhead back to kettle. During boilout, check the temperature recorder with potentiometer. If agreement is not within 3°F., have recorder corrected before beginning run.

d. After 1 hour, cool boilout to 120°F. and transfer to scrap acetone trailer using 5 psig inert gas pressure. Check decanter to be sure it is empty.

e. If supervisor or P.E. specifies, repeat above boilout with Charge B (acetone).

f. Pull vacuum on 303-A-01 to dry. Check vacuum jets to be sure they are working properly. Jets should be able to pull 15 mm Hg. on kettle.

g. Pull vacuum on 303-A-04 to dry it. Open valves so that the transfer line from 303-A-04 to 303-A-01 is also dried.

h. Check plate-and-frame filter to be sure it is clean and has new filter papers installed. Each plate should have two sheets of coarse filter paper.

3. Pressure test 303-A-01 at 35 psig and 303-A-04 at 25 psig. Repair leaks if kettle loses more than 1 psig in 30 minutes. Have supervisor approve system (cleanliness and dryness) and record same in data before proceeding.

Charging and Dehydrating Alcohol in 303-A-01:

4. Set batch set point at 205°F. with jacket high limit at 250°F. Transfer Charge C (Alcohol) from the heated weigh tank (307-A-11) to the clean dry reactor (303-A-01). Turn agitator on at 30 rpm.

5. Set overhead to strip any water or inerts present in the alcohol to be pulled by jets through condenser. Turn agitator on at 60 rpm. Be sure condenser cooling water is off. Adjust batch set point to 220°F. and jacket high limit to 260°F.

OPERATING PROCEDURE: (Cont'd)

When batch temperature reaches 215-220°F., pull maximum vacuum (at least 25") through decanter and hold for 1-1/2 hours. (While in hold in 303-A-01, set up to add Charge D to 303-A-04 per step 6). After 1-1/2 hour hold, send a 4-ounce agitated sample to Q.C. lab for release. If not released, repeat hold period and then resample. Check to be sure decanter is empty.

Charging Epichlorohydrin to 303-A-04:

6. Set up to add Charge D (epichlorohydrin) to 303-A-04. Before charging this material, read the safety standard and additional safety precautions carefully. Consult supervisor or P.E. if you have any questions.
7. Bring in the epichlorohydrin drums and place them in the charging area. Clamp a spot exhaust hose to the drum at the large bung. Put on neoprene suit, boots, and gloves. Also wear a fresh air mask while charging.
8. Pull 15" vacuum on 303-A-04, then isolate the kettle from the vacuum system. Carefully vent the epichlorohydrin drum to the exhaust duct. Insert a dip pipe (with charge valve) long enough to reach bottom of drums and then vacuum in Charge D. (Charge D is to be five full drums of record actual weight charged). Notify supervisor if not within 20 lbs. of amount specified. When all of Charge D is in feed kettle, break vacuum with nitrogen. Keep kettle vent closed, ready for transfer at step 13.
9. After adding Charge D, have the empty epichlorohydrin drums moved to the drum washing station beside building 2. Triple rinse the empty epichlorohydrin containers with water and label drums as "triple-rinsed" with date and initials. Observe the precautions in the safety standard when handling the drums. The drums can then be sent to the reconditioner. Record in the data that the drums have been rinsed.

OPERATING PROCEDURE: (Cont'd)

Charging Stannic Chloride to 303-A-01:

10. When release has been obtained on step 5 sample, proceed with Charge E (stannic chloride). Cool batch in 303-A-01 to 200 - 205°F. Place stannic chloride container on scales and use dip pipe with cut-off valve for vacuuming in charge. Wear fresh air mask and rubber gloves when handling and use spot exhaust to remove HCl vapors.

NOTE: Stannic chloride anhydrous must be used under dry conditions as moisture hydrolyzes the catalyst and releases HCl vapor.

11. With batch at 200-205°F., evacuate 303-A-01 to 15-inches vacuum and isolate reactor from jets. (Do not pull vacuum directly on 303-A-01. Instead pull vacuum through the 303-A-03 receiver not in use). Quickly vacuum in Charge E. (Do not use the same kettle nozzle through which Charge D will be transferred). Expect a small exotherm of about 5°F. when Charge E is added. Immediately cap the container after charging. Break vacuum with nitrogen. Keep vent of 303-A-01 closed. Mix for one hour at 200-205°F. and 90 rpm agitation. Any trace of stannic chloride left in an empty 5-gallon container is to be neutralized by thoroughly flushing with water outside the building.

Epichlorohydrin Addition and Reaction:

12. After mixing 303-A-01 contents for 1 hour, increase batch temperature to 205-210°F. Increase agitator speed to 120 rpm. Have 303-A-01 overhead set for total reflux back to kettle; have vent closed on 303-A-01. Condenser cooling water should be off.

OPERATING PROCEDURE: (continued)

Epichlorohydrin Addition and Reaction: (continued)

13. Pressure 303-A-04 to 20 psig with nitrogen. Then open all valves in the transfer line from the bottom of 303-A-04 to the top of 303-A-01 except for the needle valve at the rotameter. Slowly open the needle valve until the rotameter reads 95-100% on 0-100% scale. If rotameter with 0 to 1 scale is used, adjust until float is at 0.95-1.00 (~1 GPM). It is important that this rate should remain constant over the entire addition period of about 4 hours. Keep a close watch on the rotameter and adjust the valve as necessary to keep the correct reading on the rotameter. Be sure to record the time at the start of the epichlorohydrin addition on the run card.

NOTE: The reactor must be attended during the entire addition period. Do not leave the kettle unless you are relieved.

14. When the transfer is complete, as seen in the rotameter tube, blow nitrogen through the transfer line to assure clearing the line, then immediately close the charge valve to 303-A-01. Close the other valves in the transfer line. Be sure to record the time at the end of the epichlorohydrin addition on the run card.

15. Carefully vent the pressure off of 303-A-04 and the transfer line. Then close the vent.

16. Hold the batch in 303-A-01 at 205-210°F. and 120 rpm agitation for five hours with the vent closed. During the total 5-hour hold, see step 30 for decontamination of feed kettle, 303-A-04.

17. After the 5-hour hold, carefully vent off any pressure on 303-A-01 (thru cold side of condenser) to vacuum jets. With spot exhaust at sight glass and wearing gloves, open sight glass hole and take a 4-ounce sample. Seal sight glass hole and close vent. Send sample to Q.C. Lab and wait on results before proceeding. Keep batch at 205-210°F. and 120 rpm while waiting on results.

OPERATING PROCEDURE: (continued)

Epichlorohydrin Addition and Reaction:

18. If Q.C. reports % unreacted epichlohydrin or % unreacted alcohol as out-of-spec., hold at 205-210°F. and resample every 2 hours until released. When Q.C. release is obtained, proceed to step 19. If after 2 resamples the batch is still out-of-spec., contact P.E.

Catalyst Neutralization:

19. Reduce agitation to 90 rpm and begin cooling batch to 155-160°F.

20. While cooling, set up to add Charge F (MIBK). Premix Charges G (D.I. Water) and H (sodium carbonate) in a G&Y OH drum (code). Use D. I. Water for Charge G (from the heat exchanger at approx. 150°F.) for better solution of the sodium carbonate.

21. While cooling, pull 10-inches vacuum on 303-A-01. Isolate kettle from vacuum system. Vacuum in all but about 50 pounds of Charge F (MIBK). Then immediately vacuum in the premix of Charges G and H. Next, immediately add the last 50 pounds of Charge F (MIBK) to the premix drum, mix it, and vacuum that slurry into 303-A-01. Add any available Charge I (filter drippings) at this time, also. Release vacuum with nitrogen. Agitate at 90 rpm for 1 hour while continuing to cool to 150-160°F., then proceed to filtration.

Filtration:

NOTE: Prior to starting filtration, obtain the JIT for the "Vertical Filter Press", by (Feb. 17, 1969). The JIT should be kept available in the operating area during the filtration.

22. Add Charge J (Hy-Flo Supercel) to 303-A-01 through the manhole with a small nitrogen purge on the reactor and with the exhaust trunk in place. Turn on agitator at 45 rpm and hold batch at 125°F. throughout filtration.

OPERATING PROCEDURE: (Cont'd)

23. Be sure that the plate-and-frame filter is thoroughly cleaned and is ready for filtering from the kettle, 303-A-01, to code 100 poly-insert drums. Inspect all drums with a flashlight before use to assure cleanliness. Flush with water to clean. Clean stainless hoses should be used for feed and filtrate line connections. Two sheets of coarse grade filter paper should be installed on each plate. Install a 6-unit Cuno with 50-micron cartridges (stock item) or a Galfo bag filter with a 50-micron bag (stock item) at the plate-and-frame outlet.

24. Begin filtering product from 303-A-01 into clean code drums, maintaining 25 psig pressure on the kettle. Recycle the first couple of cloudy drums until the filtrate becomes clear and free of solids.

25. Package product at 400 lbs./drum. Take a 1-pint sample from drum 3 and submit to Q.C. Label drums as follow:

    lot

    drum number

    net weight

    "Flammable" (code)

26. Constantly check the sight glasses on filter outlet and take samples from the drums to be sure filtrate is clear and free of solids. (Recycle samples). If samples from the drums do not appear crystal clear, the material filtered thus far must be transferred back to 303-A-01 and refiltered. If a is to follow, place the drums of filtered product in oven at 150°F. to assure that it will remain fluid for the run.

27. If the filter fills with cake and the flow stops, flush the filter with 200 lbs. of , MIBK. (Record all solvents on run card). Continue to blow-down cake (not necessarily dry) per the vertical filter press JIT. Disassemble, unload filter, install clean papers, and resume filtration per Step 24 procedure. Scrap

OPERATING PROCEDURE: (Cont'd)

cake in polybags in "soap boxes" and tag as "filter cake from , lot _____" and "incinerate". Initial and date tag; then have scrap sent to north scrap dock.

28. When the filtration is finished, close the valve at the filter outlet and the bottom valve on the kettle, 303-A-01. Vent 303-A-01 to the roof. Clean the filter by blowing down, disassembling, and unloading per the vertical filter press JIT. Filter drippings in the filter pan should be packaged in a clean code 100 drum and labeled as with lot no., net weight, H-1-3-0, and "flammable liquid" label (code). Record as by-product on run card.

Cleaning 303-A-01:

29. If the batch is to be processed as then proceed to thoroughly flush 303-A-01 with D.I. Water to remove solids.

30. If a is not to follow, flush 303-A-01 thoroughly with city water. If solids or excessive buildup is present, obtain instructions from supervisor for removal of solids. If kettle is free of solids, boil 303-A-01 for 30 minutes with Charge K refluxing through the condenser (by-passing the decanter) with condenser cooling water on. Cool to 100°F. and drain boilout to sewer.

Cleaning 303-A-04:

31. Flush 303-A-04 feed kettle thoroughly with Charge L (, city water) and drain to the sewer tank.

32. If another run is to follow, meter in Charge M (, recovered acetone) to flush inerted receiver, 303-A-04. Bubble nitrogen thru bottom valve to agitate, then drain to scrap acetone trailer. Use vacuum to dry feed kettle thoroughly.

CONTAINERS:

Step No.	Container Code	Description	Est. Amt.
20		G&Y 55-gal. OH	1
23		Black 55-gal. polyinsert	50
28		Black 55-gal. polyinsert	1

STORAGE:

Inside warehouse. Red label.

SAMPLES:

Step No.	Amount	Description	Disposition
5	4-ounce	Alcohol	Scrap
17, 18	4-ounce	/EPI Adduct Alcohol	Scrap
25	1-pint	Final-drum #3	Retain

SPECIFICATION FOR RELEASE:

Step No.		Test	Specification	Test Method
5*		ppm H_2O	1,000 maximum	QCM-4.9
17, 18	A.	ppm Unreacted Epichlorohydrin	1,000 maximum	QCM-137.291
	B.	% Unreacted Alcohol	25 maximum	QCM-137.292
25	A.	Appearance	Clear, amber solution	Visual
	B.	% Solids	Record (expect 70-80)	QCM-1.1.6
	C.	Computer Control	None	- - - -

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* Run on molten sample.

CHEMICAL SAFETY INFORMATION

NAME: ACETONE

DESCRIPTION:

is a volatile liquid with a boiling point of 135°F. under normal conditions. It gives off vapors which form flammable and explosive mixtures with air at or above the flashpoint of 3°F.

HANDLING:

A. Health Hazards: Can produce a scaly, dry dermatitis after repeated skin contact. High vapor levels may irritate eyes and throat and produce narcosis.

B. Fire Hazards: The greatest handling hazard is its fire hazard. Because of its low boiling point (135°F.) and very low flash point (3°F.), it readily gives off volatile flammable vapors which form explosive mixtures with air from 2.5 to 13% by volume in air.

vapors are twice as heavy as air. The liquid is soluble in water in all proportions; therefore, water is a particularly effective extinguishing agent.

C. Recommended Methods: All equipment and auxiliaries must be of the explosion proof type Group D classification. Use in well ventilated areas. Wear face shield, or chemical safety goggles and rubber gloves where there is danger of splashing. Avoid unnecessary breathing of acetone vapors or contact with the skin.

FIRST AID:

Eye Exposure: Immediately, flush the eyes with copious amounts of running water for at least ten minutes. An eye wash fountain is preferred, but other sources of running water will suffice.

Consult a nurse or physician.

Continued

Skin Exposure: Small areas of exposed skin should be washed immediately with water and soap, and rinsed thoroughly with water.

In the case of contact and/or exposure of a large skin area or clothing, place the person under the nearest safety shower and remove the clothing while the person is under the shower. The skin should be thoroughly drenched, and followed by a gentle lathering with soap and water. This should be followed by a thorough rinsing.

Consult a nurse or physician.

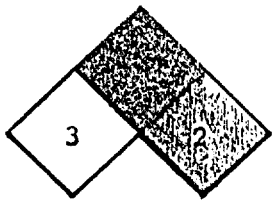
Contaminated clothing should be laundered before reusing.

REFERENCES:

Celanese Chemicals Special Bulletin S-02-2.

Safety Engineer

CHEMICAL SAFETY INFORMATION



NAME: EPICHLOROHYDRIN (ECH)

DESCRIPTION:

Colorless mobile liquid with an irritating chloroform odor. The odor threshold is 10-25 ppm.

HANDLING:

A. Health Hazards: ECH is hazardous as a liquid and a vapor. The vapors are severly irritating to the eyes, nose, and throat. Repeated or prolonged exposures may cause severe lung, liver, kidney and blood changes. High vapor concentrations can be fatal.

Liquid can cause severe burns and permanent injury from contact with eyes and skin. It is readily absorbed through skin and penetrates leather easily.

A cancer suspect agent. ECH has been reported to produce cancer in laboratory animals.

B. Fire Hazard: A flammable liquid - FlashPoint 87°F. ECH can polymerize violently on distillation or in the presence of acids, bases, amines, ammonia, and iron, aluminum, and zinc salts, and certain alloys (Na, Zn, AL, & MO).

C. Handling: Handle as a flammable toxic liquid. Avoid breathing of vapor and skin contact: Keep in closed systems and use good local exhaust ventilation on any open containers or sources of vapor release.

If vapor inhalation or skin contact may be possible, wear supplied air respirator and appropriate protective equipment (gloves, jacket, pants, boots) as required to prevent any skin contact.

D. Spills or Leaks: Remove all ignition sources. Evacuate personnel not equipped with protective clothing and air supplied respirators or self contained breathing apparatus. Absorb small quantities in inert material (SORB-ALL). Waste ECH should be placed in closed, properly labelled, containers.

Continued

FIRST AID:

Eye Exposure: Wash eyes with water for at least 15 minutes. Get medical attention.

Skin Exposure: Remove contaminated clothes immediately. Wash skin thoroughly with large amounts of water. Get medical attention.

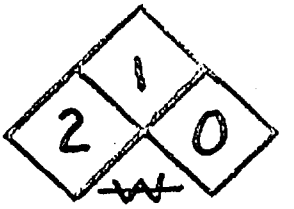
Inhalation: Remove person to uncontaminated area. If breathing has stopped, give artificial respiration. Get medical attention as soon as possible.

Contaminated leather (such as shoes) cannot be decontaminated and must be destroyed.

Safety Engineer Industrial Hygiene Process Engineering

January 2, 1979

CHEMICAL SAFETY INFORMATION



NAME: Stannic Chloride - anhydrous
Synonyms:
Tin TeTrachloride

CODE NO.

DESCRIPTION:

Colorless, fuming liquid. Must be used under dry conditions because exposure to moisture will hydrolyze and release HCl vapors.

HANDLING:

A. Health Hazards: Corrosive to skin and eyes. Vapors react with moisture in air to form hydrochloric acid which is very irritating to eyes and respiratory system.

B. Fire Hazards: Vigorous chemical reaction with water. Upon contact with moisture, considerable heat is generated. Not combustible.

C. Recommended Methods: Avoid inhalation of vapor. Use spot ventilation and wear fresh air mask. Avoid eye and skin contact. Wear rubber gloves when handling. In case of spill, cover area with Zorball. Place in polybag with bag tie. Wash down area with plenty of water.

FIRST AID:

Eye Exposure: Flush thoroughly with plenty of water for at least 15 minutes. Consult nurse or other Medical Dept. personnel.

Skin Exposure: Skin should be immediately washed with soap and water and flushed thoroughly. Report to nurse. Saturated clothing should be removed before washing to avoid burns from heat generated in reaction with water

Inhalation Exposure: Remove person from exposed area. If there is severe respiratory irritation or shortness of breath, oxygen administration is helpf

Ingestion Exposure:

REFERENCES: Vulcan Safety Data Sheet

1) Irving Sax, Dangerous Properties of Industrial Chemicals, 3rd Ed., (Reinhold Book Corp., New York), 1968.

2) Discussion

DATE: 11/26/79

PREPARED BY:

CHEMICAL SAFETY INFORMATION

NAME: KETONES (METHYL ISOBUTYL KETONE, MIBK, HEXONE)
(METHYL ETHYL, MEK, BUTANONE)

DESCRIPTION:

MIBK and MEK are colorless liquids with an acetone-like, distinct irritating odor. Both are dangerous fire hazards; toxic concentrations give good warning action by irritation of eyes and throat.

HANDLING:

A. Health Hazards: Produce a dry, scaly, and fissured dermatitis after repeated exposure. High vapor concentration levels may irritate eyes and mucous membrane of nose and throat. Narcosis and unconsciousness may result from vapor exposure.

B. Fire Hazards: MIBK explosive limits 1.4 to 7.6% by volume in air; MEK: 1.8 to 11.5%. Both form flammable mixtures and are dangerous fire hazards down to 24°F. (MEK) and down to 74°F. (MIBK).

C. Recommended Methods: Personnel handling these materials, even for short periods, should wear adequate protective equipment. This includes chemical safety goggles and an approved respirator.

FIRST AID:

Eye Exposure: Immediately, flush the eyes with copious amounts of running water for at least ten minutes. An eye wash fountain is preferred, but other sources of running water will suffice.

Consult a nurse or physician.

Skin Exposure: Small areas of exposed skin should be washed immediately with water and soap, and rinsed thoroughly with water.

In the case of contact and/or exposure of a large skin area or clothing, place the person under the nearest safety shower and remove the clothing while the person is under the shower. The skin should be thoroughly drenched, and followed by a gentle lathering with soap and water. This should be followed by a thorough rinsing.

Consult a nurse or physician.

Contaminated clothing should be laundered before reusing.

Continued

Inhalation Exposure: Immediately remove person from exposure area to a non-contaminated area. Have the person rest and keep him warm.

Oxygen administration is helpful if there is severe respiratory irritation or shortness of breath. Administer mouth to mouth resuscitation if breathing has stopped.

Consult a nurse or physician.

Safety Engineer